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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/648,864

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Michikazu Kondo

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7590

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EXAMINER

STEIN, JAMES D

ART UNIT

PAPER NUMBER

2874

DATE MAILED: 02/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/648,864

Applicant(s)

KONDO ET AL.

Examiner

James D. Stein

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 6 and 11-18 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 7-10, 19 and 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 0803.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Claim Objections*

Claim 5 objected to because of the following informalities: Applicant claims a “second mirror,” but neither claim 5 nor associated parent claim 1 limit a first mirror. Due to the lack of antecedent basis for the recitation of “second mirror” in claim 5, the examiner believes that applicant intended for the claim to read a “first mirror” instead, and the claim has been treated as such. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 5, 6, 11-13, and 16 are rejected under 35 U.S.C. 102(e) as being unpatentable over [USPAT 6,526,194] to Laor. Laor discloses a related optical switch with magnetic actuation.

With regard to claim 1, Figs. 13, 14, and 17 of Laor show an optical switch comprising an electromagnetic driving mechanism with a U-shaped magnetic core 26 having an intermediate part with a coil portion 25 wound thereon between two leg portions (N and S portions). A magnetic armature top portion (11, 9, and 16) with two end portions 11 and supported in such a manner that the armature can make an oscillating motion (col 9 line 13 and col. 10 lines 18-24) according to the applied electric current. Furthermore, a permanent magnet 17 is arranged to

apply magnetic flux to the U-shaped core 26 (see entire document, esp. col. 8, lines 6-26).

Additionally, an optical path switching unit comprising mirror 9 is shown by the figures to be directly fixed to the armature. Fig. 1 shows incident-side (input) optical fibers 4 where light 2 with its optical path is switched by the optical path switching unit(s) 5 so as to be coupled to emission-side (output) optical fibers 4 (fiber optic cables 3 and 4 taught on col. 6 lines 32-34).

It is noted to applicant that Laor teaches the permanent magnet portion 17 of the armature to be made of soft, ferromagnetic materials (col. 11 line 25).

With regard to claim 2, in addition to the rejection of claim 1 previously discussed above, Fig. 1 shows an incident-side optical system 3 for guiding light 2 from said incident-side optical system 3 to the optical path switching unit(s) 5 and 6, and an emission-side optical system 4 for guiding the light with switched path 8 to the emissions-side optical fiber (col. 6 lines 27-67).

With regard to claim 3, in addition to the rejection of claim 1 previously discussed above, Laor teaches a pivot point at the center of the armature (col 2, line 13). Figs. 4 and 5 show an additional embodiment with "hinge" 11 at the center of the armature so as to create a fulcrum and allow oscillation thereabout (Fig. 5). Furthermore, the turning motion is generated by switching a magnetically attracting force that acts between one of the leg parts (N) of the U-shaped magnetic core 26 and one of the end portions of the armature that faces the leg part, and a magnetically attracting force that acts between the other leg (S) part of the U-shaped magnetic core and the other end portion of the armature that faces the leg part. The attracting forces are generated by an electrical current that is applied to the coil portion 25 (col. 9 lines 36-47).

With regard to claims 5 and 6, in addition to the rejection of claim 1 previously discussed above, said mirror surface 9 of the armature is a layer on top of permanent magnet 17 and has a

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top face 15 (Figs. 4 and 5), which is taught to be reflective (col. 7 line 18). Therefore, it is inherent that the mirror 9 will reflect light in a direction that is perpendicular to the direction of oscillation (upward), which is shown by Figs. 4 and 5. Fig. 1 of Laor clearly shows the optical switch unit 5 intercepting light 2 from incidence-side optical fibers 3 and reflecting it in a direction perpendicular to that of the armature.

With regard to claims 11 and 12, in addition to the rejection of claim 1 previously discussed above, Figs. 4 and 5 show the entire armature to be covered with reflective surface 15 of mirror 9. Therefore, the optical path switching unit is provided near both end portions of the armature that face the two leg parts (N and S) of magnetic core portion 26 (Fig. 13).

With regard to claim 13, in addition to the rejection of claim 1 previously discussed above, Fig. 1 of Laor shows a plurality of both incidence-side fibers 3 and emission-side fibers 4.

With regard to claim 16, in addition to the rejection of claim 1 previously discussed above, Figs. 4, 5, 13, 14, and 17 show the permanent magnet 16 fixed to the armature. In particular, Fig. 5 shows the permanent magnet oscillating together with the armature.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Laor as applied to claim 1 above, and further in view of applicant's admitted prior art [JP-A-63-301441] to Yokoo .

Laor teaches the permanent magnet 17 to be in between the U-Shaped magnetic core 26 and armature (Figs. 4, 5, 13, 14, and 17). However, Laor does not teach said permanent magnet 17 to be situated with one magnetic pole near the center of the U-shaped magnetic core 26 and the other magnetic pole near the fulcrum of the oscillating motion of the armature. Figs. 2A-C of Yokoo show a device similar to the magnetic actuator device taught by Laor but with the permanent magnet 2 arranged with one magnetic pole near the center of the U-shaped magnetic core 1 and the other magnetic pole near the fulcrum A of the oscillating motion of the armature. Yokoo teaches this arrangement provides increased magnetic efficiency and more sensitive operation (abstract, Yokoo). Therefore, it would have been obvious at the time of the invention to one of ordinary skill in the art to modify the device as taught by Laor to include the permanent magnet arranged vertically so as to position one magnetic pole near the center of the U-shaped magnetic core 1 and the other magnetic pole near the fulcrum A of the oscillating motion of the armature in order to provide for a more magnetically efficient and sensitive device, which would result in more precise coupling of the light 2 from incidence-side fibers 3 into the emission-side fibers 4.

Claims 15, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laor as applied to claim 1 above, and further in view of applicant's admitted prior art [EP1049127] to Saito et al.

With regard to claim 15, Laor teaches the permanent magnet 17 to be in between the U-Shaped magnetic core 26 and armature (Figs. 4, 5, 13, 14, and 17). However, Laor does not teach said permanent magnet 17 to be a composite permanent magnet having one magnetic pole on its both ends and the other magnetic pole at its central portion, the permanent magnet 17

being located between the two leg parts of the U-shaped magnetic core 26. Applicant's admitted prior art, figs. 2A-C of Saito show a device similar to the magnetic actuator device taught by Laor but with the permanent magnet 17 comprising a composite permanent magnet having one magnetic pole on its both ends (S) and the other magnetic pole (N) at its central portion, the permanent magnet 17 being located between the two leg parts of the U-shaped magnetic core 26. Saito teaches this arrangement to have high reliability and an inexpensive method of manufacture (applicant's spec. page 11 lines 10-11). Therefore, it would have been obvious at the time of the invention to one of ordinary skill in the art to modify the device as taught by Laor to include a composite permanent magnet 17 having one magnetic pole on its both ends and the other magnetic pole at its central portion, the permanent magnet 17 being located between the two leg parts of the U-shaped magnetic core 26, in order to provide for a reliable, but inexpensive device.

With regard to claim 17, in addition to the rejection of claim 1 previously discussed above, Laor discloses the claimed invention except for the electromagnetic driving mechanism to further comprise a fixed-side insulator base for integrally holding the U-shaped magnetic core and the permanent magnet and a moving-side insulator for holding the armature, and the U-shaped magnetic core and the permanent magnet are fixed by integral molding of the fixed-side insulator base, with the permanent magnet held in contact with a part of the U-shaped magnetic core. Applicant's admitted prior art, fig. 2 of Saito shows an electromagnetic driving mechanism similar to that taught by Laor, but with said electromagnetic driving mechanism further comprising a fixed-side insulator base 15 for integrally holding the U-shaped magnetic core 31 and the permanent magnet 18 and a moving-side insulator 45 for holding the armature 47 (abstract and col. 10 lines 32-40), and the U-shaped magnetic core 31 and the permanent magnet

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18 are fixed by integral molding of the fixed-side insulator base 15, with the permanent magnet 18 held in contact with a part of the U-shaped magnetic core 31 (abstract, and col. 9 lines 18-27). Saito teaches this electromagnetic driving mechanism to be advantageous because the design facilitates improved accuracy in positioning of the components of the electromagnetic driving mechanism (abstract). Therefore, it would have been obvious at the time of the invention to one of ordinary skill in the art to modify the device as taught by Laor to include said electromagnetic driving mechanism to further comprise a fixed-side insulator base 15 for integrally holding the U-shaped magnetic core 31 and the permanent magnet 18 and a moving-side insulator 45 for holding the armature 47, and the U-shaped magnetic core 31 and the permanent magnet 18 are fixed by integral molding of the fixed-side insulator base 15, with the permanent magnet 18 held in contact with a part of the U-shaped magnetic core 31, in order to more accurately position the components of the electromagnetic driving mechanism.

With regard to claim 18, in addition to the rejection of claim 1 previously discussed above, Laor discloses the claimed invention except for the electromagnetic driving device to further comprise a hinge spring part for supporting the armature while applying an energizing force or a damping force to the oscillating motion of the armature, and a moving spring part interlocked with the oscillating motion of the armature. Applicant's admitted prior art fig. 1A of Saito et al shows a hinge spring part 54 for supporting the armature while applying an energizing force or a damping force to the oscillating motion of the armature 47, and a moving spring part 51/53 interlocked with the oscillating motion of the armature 47 (col. 10 line 58 through col. 11 line 36). Saito teaches this construction to be advantageous because it provides pivotal movement of the armature about the hinge point and will restore the armature 48 to a neutral



state when the electrical current is terminated (col. 11 lines 32-36). Therefore, it would have been obvious at the time of the invention to modify the device as taught by Laor to include a hinge spring part 54 for supporting the armature while applying an energizing force or a damping force to the oscillating motion of the armature 47, and a moving spring part 51/53 interlocked with the oscillating motion of the armature 47 in order to provide for pivotal movement of the armature about the hinge point and will restore the armature 48 to a neutral state when the electrical current is terminated.

***Allowable Subject Matter***

Claims 4, 7-10, 19 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the cite prior art taken alone or in combination discloses or obviates an optical path switching unit comprising: a mirror installed on the armature and in such a manner that it has a light reflected direction within a plane substantially parallel to the oscillating direction of the armature; a transparent member having various planes of light incidence and various planes of light emission that are arranged in different orientations with respect to the oscillating direction of the armature;

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: [USPAT 6,385,365] to Rosete et al and [USPUB 2002/0181839] to Brown et al, which disclose related optical switching devices with magnetic actuation.

Applicant's prior art submitted on the Information Disclosure Statement (PTO-1449) has been considered by the examiner.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James D. Stein whose telephone number is (571) 272-2132. The examiner can normally be reached on M-F (8:00am-4:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



  
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PRIMARY EXAMINER